

REMARKS

Claims 22-46, and 48-51 are all the claims pending in the application. By this Amendment, Applicants add new claim 51.

Claim Rejections - 35 U.S.C. § 103

Claims 22-31, 34, 37, 39, 41-46, and 48-50 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Publication No. 2004/0165558 to Ling *et al.* (“Ling”) in view of U.S. Publication No. 2004/0143428 to Rappaport *et al.* (“Rappaport”)¹. For *at least* the following reasons, Applicants respectfully traverse the rejection.

Applicants respectfully submit that claim 22 is patentable over the alleged combination of Ling and Rappaport. For example, claim 22 is directed to a radio communications device. The radio communications device comprises, *inter alia*, a transmitter, a receiver, propagation detecting means, and symbol rate setting means. The transmitter comprises, *inter alia*, a plurality of transmission antennas, a plurality of transmitting circuit means, and transmission signal processing means. The receiver comprises, *inter alia*, a plurality of reception antennas, a plurality of receiving circuit means, and reception signal processing means.

The propagation detecting means detects *a propagating state of said radio waves received by said plurality of the reception antennas*. The symbol rate setting means *selects a symbol rate, to be used during modulation and demodulation, from a plurality of symbol rates based on the detected propagating state*. The symbol rate setting means sets the selected symbol rate in said modulating means and said demodulating means.

¹ Although the statement of rejection in paragraph 3 on page 2 of the Office Action lists a patent number next to the Rappaport reference, the PTO-892 form attached to the Office Action lists the correct publication number.

The Examiner contends that Ling's FIGS. 1, 5, and 6, along with paragraphs [0022]-[0023], [0031], [0034]-[0035], and [0040]-[0041] teach most of the above-noted features of claim 1. The Examiner acknowledges that Ling does not explicitly teach the claimed symbol rate setting means, but contends that Ling teaches a "coding and modulation schemes setting means for selecting a coding and modulation scheme...to be used during modulation and demodulation, from a plurality of coding and modulation schemes based on the detected propagating state" (Office Action, page 3, lines 12-16). Further, the Examiner contends that Rappaport's paragraph [0045] teaches setting and selecting a symbol rate based on a detected propagating state, and that it would be obvious to a skilled artisan to modify the invention of Ling "to adjust various settings such as symbol rates to achieve identified performance goals for the communication network, as taught by Rappaport, thus facilitating the automated determination of desirable configuration setting for the wireless transceivers" (Office Action, page 3, line 17 to page 4, line 3). Applicants respectfully disagree.

Specifically, Applicants submit that even if the teachings of Ling and Rappaport were combined, the combination still would not teach or suggest the claimed propagation detecting means and symbol rate setting means. For instance, Ling is directed to Multiple-Input Multiple-Output (MIMO) systems similar to the instant application, and thus discloses a communication system with multiple transmission/reception antenna pairs and corresponding transmission/reception circuitry. Ling specifically provides a technique to process received signals in a MIMO system to recover transmitted signals, and to estimate the characteristics of a MIMO channel. By using various receiver processing schemes, channel state information (CSI) which is indicative of the characteristics of the transmission channels is derived in Ling (e.g., see Ling: Abstract, and paragraphs [0008]-[0010]). The CSI is reported back to the transmitter

system (in a feedback loop) and is “used to adjust the signal processing (e.g., coding, modulation, and so on)” (Ling, paragraph [0010]).

As such, the Examiner contends that the CSI corresponds to the claimed propagating state, based on which the claimed symbol rate is selected. Applicants respectfully disagree, because Ling does not teach adjusting a symbol rate. For example, as shown in Ling’s TABLE 1, Ling teaches adjusting a number of Coded Bits/Symbol and the Coding Rate. In the normal use, when the propagated state in Ling (represented by CSI - channel state information) is worse (i.e., the SNR is low), the number of Coded Bits/Symbol is reduced. Adjusting the number of Coded Bits/Symbol does not teach or suggest adjusting the symbol rate itself, as claimed.

Rappaport is directed to adapt a network configuration to the optimal configuration (including a symbol rate) obtained through a site-specific network model. Rappaport, however, does not teach or suggest a mechanism to link the propagating state and the symbol rate, contrary to the Examiner’s assertions. Therefore, even if Ling and Rappaport are combined, the combined teachings do not teach or suggest the claimed symbol rate setting means. In other words, the combined teachings do not teach or suggest linking the symbol rate to the propagating state, as claimed. Accordingly, claim 21 is patentable over the combination of Ling and Rappaport.

Claims 23, 41-44, 49, and 50 recite features similar to those discussed above with respect to claim 22. Therefore, claims 23, 41-44, 49, and 50 are patentable for *at least* reasons similar to those given above with respect to claim 22.

Claims 24-31, 34, 37, 39, 45, 46, and 48 are patentable *at least* by virtue of their dependency. Moreover, claims 27 and 29 are patentable for reasons in addition to their dependency.

For example, claims 27 and 29 recite, in some variation, that the control means determines an intensity of multipath interference based on the propagating state of said received radio waves detected by said propagation detecting means, instructs said symbol rate setting means to set *a high symbol rate* in said modulating means and said demodulating means *when it is determined that the intensity of the multipath interference is weak*, and instructs said symbol rate setting means to *set a low symbol rate* in said modulating means and said demodulating means *when it is determined that the intensity of the multipath interference is strong*. Neither Ling nor Rapport teach these features.

In particular, Ling and Rappaport do not teach adjusting the symbol rate using the propagating state representative of an intensity of the multipath, as claimed. A measure that is often used in the propagating state is the SNR. Taking this into account, Ling's TABLE 1 shows that when SNR is reduced (corresponding closest to determining that the intensity of the multipath interference is strong), the number of Coded Bits/Symbol is reduced (Applicants point out that reducing the number of Coded Bits/Symbol does not teach setting a low symbol rate, as discussed above with respect to claim 21). On the other hand, claims 27 and 29 recite that the control means instructs said symbol rate setting means to set a low symbol rate (i.e., not the number of Coded Bits/Symbol) in said modulating means and said demodulating means when it is determined that the intensity of the multipath interference is strong. As such, Ling's alleged symbol rate adjustment with respect to the intensity of the multipath interference does not teach or suggest the claimed symbol rate adjustment with respect to the intensity of the multipath interference.

Moreover, as any skilled artisan would understand, the claimed control means would setting a low symbol rate to increase the number of Coded Bits/Symbol (when the multipath

interference intensity is strong). In Ling, as noted above, the number of Coded Bits/Symbol is reduced when the multipath interference intensity is strong. Therefore, for this additional reason, Ling does not teach or suggest the above-noted features of claims 27 and 29.

Claims 32, 33, and 38 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ling in view of Rappaport, and further in view of U.S. Publication No. 2005/0075073 to Kadous *et al.* (“Kadous”).

Claims 32, 33, and 38 depend from claims 22 or 23. Since Kadous does not cure the deficient teachings of Ling and Rappaport with respect to claims 22 and 23, claims 32, 33, and 38 are patentable *at least* by virtue of their dependency.

Claims 35 and 36 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ling in view of Rappaport, and further in view of U.S. Patent No. 5,861,781 to Ashby.

Claims 35 and 36 depend from claims 22 or 23. Since Ashby does not cure the deficient teachings of Ling and Rappaport with respect to claims 22 and 23, claims 35 and 36 are patentable *at least* by virtue of their dependency.

Claim 40 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Ling in view of Rappaport, and further in view of U.S. Publication No. 2005/0058114 to Santhoff *et al.* (“Santhoff”).

Claim 40 depends from claim 22. Since Santhoff does not cure the deficient teachings of Ling and Rappaport with respect to claim 22, claim 40 is patentable *at least* by virtue of its dependency.

New Claim

New claim 51 recites that a first symbol rate in said plurality of modulating means and a second symbol rate in said plurality of demodulating means are set based on an intensity of the

multipath interference which is determined based on a propagating state of the radio waves.

Therefore, claim 51 is patentable over the prior art of record for *at least* reasons similar to those discussed above with respect to claims 27 and 29.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

/Quadeer A. Ahmed/
Quadeer A. Ahmed
Registration No. 60,835

WASHINGTON OFFICE

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